

Appl. No. 10/507,478
Reply to Office action of 5/18/06

RECEIVED
CENTRAL FAX CENTER
AUG 22 2006

REMARKS

Claims 1-7 remain in this application. Claim 1 has been currently amended and claims 2-7 are pending as originally filed.

The Examiner acknowledged that claims 3-4 and 6-7 are directed to allowable subject matter. Applicants acknowledge that in view of declarations, evidence and Abstract provided herein, all pending claims are allowable (submitted as Exhibits A, B and C).

The evidence (Exhibit C) will show that while the previously submitted Abstract bears a September 20, 2001, date, it was not until the first day of the conference on October 9, 2001, that the Abstract was distributed for purposes of § 102(b).

The newly submitted translated version of the Abstract (Exhibit B) is the correct version of the translation which affirmatively shows that the Abstract was only printed on September 20, 2001. Moreover, a Declaration (Exhibit A) by the Director of the Catalytic Forum shows that the Abstract was not distributed and/or made publicly available until the first day of the forum on October 9, 2001.

Claim 1 has been amended to overcome indefiniteness rejections under § 112, ¶ 2. The amendments are supported by the specification at page 4, lines 12-15 and do not contain new matter.

Applicants respectfully request that a timely Notice of Allowance be issued in this case in view of the following.

Appl. No. 10/507,478
Reply to Office action of 5/18/06

1. **Rejection of Claims 1-7 under 35 U.S.C. § 112, ¶ 2**

The Office Action rejected claims 1-7 as being indefinite for failing to particularly point out and distinctly claim the subject matter of the claims as follows:

Claim 1 recites, “adding and dissolving . . . hydrolyzing, polymerizing and self-assembled . . . to produce a sol solution.” It is indefinite as to what is being added and dissolved, the transition metal or metal alkoxide. Also, it is indefinite as to what is being hydrolyzed, polymerized and self-assembled.

Applicants respectfully traverse the rejection because presently pending claim 1 recites that the transition metal salt, which is a precursor of a transition metal oxide and/or a metal alkoxide is being added to a solution prepared by dissolving a polymer surfactant in an organic solvent. Claim 1 also recites dissolving the transition metal salt followed by hydrolyzing the transition metal salt and/or alkoxide and preparing a sol solution which is polymerized and self-assembled therefrom.

Hence, it is clear that the transition metal salt and/or metal alkoxide is being hydrolyzed while the sol solution is being polymerized and self-assembled as supported by the specification at page 4, lines 12-15.

Accordingly, Applicants respectfully submit that claim 1 and the dependent claims 2-7 are definite and request reconsideration and withdrawal of the rejection.

Appl. No. 10/507,478
Reply to Office action of 5/18/06

2. **Rejection of Claims 1-2 and 5 under 35 U.S.C. § 102(a)**

The Office Action rejected claims 1-2 and 5 as being anticipated by “Synthesis of High surface area microporous niobium oxide using neutral template and characterization”, 88th Catalysis Society of Japan printed on 09/20/2001, but not distributed and/or made publicly available until October 9, 2001, (“Byonjin *et al.*”). The Office Action stated:

Byonjin discloses a method for preparation of transition metal oxide having micro-mesoporous structure whose average fine pore size is not less than 1 nm and not more than 2 nm comprising, adding and dissolving transition metal salt which is a precursor of transition metal oxide prepared by dissolving polymer surfactant in organic solvent, hydrolyzing, polymerizing and self-assembled the transition metal salt to produce sol solution, and then obtaining framework-stabilized gel from the sol solution, and removing the polymer surfactant by using water at room temperature. The surface area of transition metal oxide having mesoporous structure is from 100 m²/g to 500 m²/g (pages 1-2).

Applicants respectfully traverse the rejection because Byonjin *et al.* is not prior art under § 102(a) because the reference is not “by another”. As the court stated in In re Katz, a printed publication cannot stand as a reference under § 102(a) unless it is describing the work of another. 215 U.S.P.Q 14, 18 (C.C.P.A. 1982). Moreover, the threshold of this determination is basically an evidentiary one wherein the sufficiency of Applicant’s showing to establish that the subject disclosure was his original work can be shown by a § 1.132 Declaration. Id.

In the present application, Applicants note that the § 1.132 Declaration filed with the original filing papers of September 14, 2004, clearly indicated that Byonjin *et al.* was the work of the three inventors of the captioned application: Kazunari Domen, Junko Nomura and Ri

Appl. No. 10/507,478
Reply to Office action of 5/18/06

Byonjin.

The remaining authors of the publication, Mr. Michikazu Hara and Mr. Ru Dairin, were working under the direct supervision of the captioned inventors. Hence, the reference is not “by another” and is not prior art for § 102(a) purposes.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the § 102(a) rejection.

3. **Rejection of Claims 1-2 and 5 under 35 U.S.C. § 102(b)**

The Office Action rejected claims 1-2 and 5 as being anticipated by “Synthesis of High surface area microporous niobium oxide using neutral template and characterization”, 88th Catalysis Society of Japan printed on 09/20/2001, but not distributed and/or made publicly available until October 9, 2001, (“Byonjin *et al.*”). The Office Action stated:

Byonjin discloses a method for preparation of transition metal oxide having micro-mesoporus structure whose average fine pore size is not less than 1 nm and not more than 2 nm comprising, adding and dissolving transition metal salt which is a precursor of transition metal oxide prepared by dissolving polymer surfactant in organic solvent, hydrolyzing, polymerizing and self-assembled the transition metal salt to produce sol solution, and then obtaining framework-stabilized gel from the sol solution, and removing the polymer surfactant by using water at room temperature. The surface area of transition metal oxide having mesoporous structure is from 100 m²/g to 500 m²/g (pages 1-2).

Appl. No. 10/507,478
Reply to Office action of 5/18/06

Applicants respectfully traverse the rejection because Byonjin *et al.* was not distributed and/or made publicly available until October 9, 2001, which is less than one year before the earliest effective filing date of October 2, 2002, the filing date of the International application PCT/JP02/10282 from which the captioned application claims priority.

The translation of the Abstract contained a translation error as did the "Petition for Proof". Both English versions of the previously submitted documents stated that the Abstract was "issued" on September 20, 2001, when in fact the correct meaning in Japanese was that the Abstract was merely printed on September 20, 2001, such that the actual public dissemination date occurred on October 2, 2002, the first day of the conference.

In a telephonic discussion of June 12, 2006, with the Primary Examiner, Steven Bos, it was agreed that the following would satisfy the Patent Office to show that the translation error was harmless error:

- (1) A new translation of Exhibit A (Petition for Proof) showing that the item in paragraph 5 states that the Abstract was "printed" on September 20, 2001.
- (2) A new translation of the last page of the Abstract where the phrase "issued on September 20, 2001" is corrected to "printed on September 20, 2001".
- (3) Evidence in support of the statement that the "reference was not distributed and/or made publicly available until the first date of the Forum" from the Catalytic Society.

Applicants have submitted the three above items as Exhibits A, B and C, respectively. In particular, Exhibit A states in paragraph 5 that the Abstract was "printed" on September 20,

Appl. No. 10/507,478
Reply to Office action of 5/18/06

2001, while Exhibit B is a new translation of the last page of the Abstract where the phrase "issued on September 20, 2001" is corrected to "printed on September 20, 2001". Exhibit C ("Petition for Proof") is a signed statement by the managing director of the Catalysis Society of Japan, Mr. Takashi Deguchi stating that the reference was **not** distributed and/or made publicly available until the first date of the Forum, October 9, 2001. See Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir.), *cert. denied*, 988 U.S. 892 (1988) (holding that proof can be established by the submission of routine business practices).

Accordingly, Applicants respectfully request reconsideration and withdrawal of the § 102(b) rejection.

4. **Rejection of Claims 1-2 and 5 under 35 U.S.C. § 103(a)**

The Office Action rejected claims 1-2 and 5 as being obvious over U.S. Patent No. 6,528,034 ("Pinnavaia *et al.*"). The Office Action stated:

A method of transition metal oxide having micro-mesoporous structure comprising, adding and dissolving transition metal salt which is a precursor of transition metal oxide and/or metal alkoxide in the solution preparation by dissolving polymer surfactant in organic solvent, hydrolyzing, polymerizing and self-assembled the transition metal salt and/or metal alkoxide to produce sol solution, and then obtaining framework-stabilized gel from the sol solution, and removing the polymer surfactant by using water at room temperature (Column 9-10). Pinnavaia discloses that the polyethylene oxide-based surfactants may be used (Column 23, Example 19).

Appl. No. 10/507,478
Reply to Office action of 5/18/06

Pinnavaia does not expressly state that average fin pore size is not less than 1 nm and not more than 2 nm and surface area of transition metal oxide having mesoporous structure is from 100 m²/g to 500 m²/g. However, it appears the process steps are the same. Therefore, the product would have an average fine pore size, which is not less than 1 nm and not more than 2 nm and a surface area of transition metal oxide having mesoporous structure from is from 100 m²/g to 500 m²/g.

Applicants respectfully traverse this rejection because the Office Action fails to establish all three prongs necessary for a *prima facie* case of obviousness. Specifically, Pinnavaia *et al.* does not teach or suggest a transition metal oxide having a micro-mesoporous structure whose average fine pore size is not less than 1nm and not more than 2nm.

Rule of Law

The Federal Circuit ruled that a *prima facie* case of obviousness must establish: (1) some suggestion or motivation to modify the references; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all claim limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

A *prima facie* case of obviousness must also include a showing of the reasons why it would be obvious to modify the references to produce the present invention. See Ex parte Clapp, 277 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). The Examiner bears the initial burden to

Appl. No. 10/507,478
Reply to Office action of 5/18/06

provide some convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings. *Id.* at 974.

Analysis

Pinnavaia *et al.* fails to teach the presently claimed invention and is instead directed to “lamellar mesoporous silica”, which is different from the micro-mesoporous transition metal oxide structures of the claimed invention. Additionally, the criticality of the claimed average fine pore size being not less than 1nm and not more than 2nm is required wherein only the claimed process steps has the unexpected results of producing thermally stable mesoporous walls and periodicity of the pores in the material.

For example, in the case of zeolite, which is a typical micro porous material, the composition is limited to selectively reacting or separating molecules having a bigger size than the fine pores such as with aromatic compound because zeolite has a pore size of less than 1 nm. Moreover, known synthesized mesoporous material sometimes lack a shape recognizing function which cannot be easily generated when reacting or separating molecules having a size of 2 nm because the pore size of fine pores is too large. Hence, the claimed average fine pore size being not less than 1nm and not more than 2nm is critical to the claimed invention wherein Pinnavaia *et al.* fails to provide any suggestion or motivation to make this limitation.

Moreover, the process steps of Pinnavaia *et al.* are not the same as those of the claimed invention and would not result in a product having an average fine pore size, which is not less than 1 nm and not more than 2 nm and a surface area of transition metal oxide having

Appl. No. 10/507,478
Reply to Office action of 5/18/06

mesoporous structure from 100 m²/g to 500 m²/g because the process steps of Pinnavaia *et al.* are directed to “lamellar mesoporous silica” while the claimed invention is drawn to micro-mesoporous transition metal oxide structures.

It also appears that an electrically neutral gemini amine surfactant in mesopores having a formula $\text{RNH}(\text{CH}_2)_m\text{NHR}^1$ is absolutely critical to the process of Pinnavaia *et al.* See claim 1 of Pinnavaia *et al.* and col. 10, line 6. In contrast, the claimed invention nowhere contains an electrically neutral gemini amine surfactant. The desirable, non-limiting examples of nonionic surfactant contemplated by the claimed invention are block copolymers (including oligomer) composed of polyethylene oxide chain $(\text{CH}_2\text{CH}_2\text{O})_m$ and polypropylene oxide chain $[\text{CH}_2\text{CH}(\text{CH}_3)\text{O}]_n$ (wherein, m and n is 10-70 and end of said polymer is etherized by H, alcohol or phenol). See specification at page 6, lines 26-30. Hence, the assertion that the “lamellar mesoporous silica” of Pinnavaia *et al.* possesses the same features as those of the claimed invention is clearly incorrect.

Even assuming *arguendo* that a *prima facie* case has been made out, the Office Action fails to give a convincing line of reasoning that would provide any suggestion or motivation to one of ordinary skill. A person of ordinary skill would not have been motivated to make an average fine pore size, which is not less than 1 nm and not more than 2 nm and a surface area of transition metal oxide having mesoporous structure from is from 100 m²/g to 500 m²/g.

For all these reasons, Applicants respectfully submit the presently pending claims is unobvious over the cited reference and request that the Examiner reconsider and withdraw the rejections to claims 1-2 and 5 under 35 U.S.C. § 103.

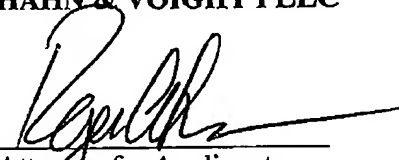
Appl. No. 10/507,478
Reply to Office action of 5/18/06

CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. The Examiner is therefore respectfully requested to reconsider and withdraw the rejection of the pending claims and allow the pending claims. Favorable action with an early allowance of the claims pending is earnestly solicited.

Respectfully submitted,

HAHN & VOIGHT PLLC



Attorney for Applicants
Roger C. Hahn
Reg. No. 46,376

HAHN & VOIGHT PLLC
1012 14TH Street, N.W.,
Suite 620
202-637-0020

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/507,478 Confirmation No. 6750
Applicant : Domen *et al.*
Filing or §371 date : September 13, 2004
TC/A.U. : 1754
Examiner : J. Fiorito
Docket No. : TAN-344
Customer No. : 62479

RECEIVED
CENTRAL FAX CENTER
AUG 22 2006

APPENDIX A

1. (Currently Amended) A method for preparation of a transition metal oxide having a micro-mesoporous structure whose average fine pore size is not less than 1nm and not more than 2nm comprising,

adding ~~and dissolving~~ a transition metal salt, which is a precursor of a transition metal oxide and/or a metal alkoxide ~~in the~~ to a solution prepared by dissolving a polymer surfactant in an organic solvent,

dissolving said transition metal salt in said solution, followed by hydrolyzing ;
~~polymerizing and self-assembled~~ the transition metal salt and/or metal alkoxide, and

preparing a ~~to produce~~ sol solution which is polymerized and self-assembled therefrom,
and then

Page 2
Appl. No. 10/507,478
Reply to Office action of 5/18/06

obtaining a framework-stabilized gel from the sol solution, and removing the polymer surfactant by using water or water to which an alkali metal or alkaline earth metal ion is added at room temperature.

2. (Original) The method for preparation of transition metal oxide having micro-mesoporous structure of claim 1, wherein surface area of transition metal oxide having mesoporous structure is from 100 m²/g to 500 m²/g.

3. (Original) The method for preparation of transition metal oxide having micro-mesoporous structure of claim 1, wherein the process to obtain the stabilized gel contains 2nd step aging process which is carried out under the presence of oxygen gas at 60° C to 140° C for 12-48 hours on the gel obtained by gelating the sol solution to gel by aging under the presence of oxygen gas at 35° C to 60° C.

4. (Original) The method for preparation of transition metal oxide having micro-mesoporous structure of claim 3, wherein surface area of transition metal oxide having micro-mesoporous structure is from 100 m²/g to 500 m²/g.

5. (Original) The method for preparation of transition metal oxide having micro-mesoporous structure of claim 1, wherein polymer surfactant is a nonionic surfactant having polyalkyleneoxide block copolymer frame.

Page 3
Appl. No. 10/507,478
Reply to Office action of 5/18/06

6. (Original) The method for preparation of transition metal oxide having micro-mesoporous structure of claim 5, wherein the process to obtain the stabilized gel contains 2nd step aging process which is carried out under the presence of oxygen gas at 60° C to 140° C for 12-48 hours on the gel obtained by gelating the sol solution to gel by aging under the presence of oxygen gas at 35° C to 60° C.


7. (Original) The method for preparation of transition metal oxide having mesoporous structure of claim 6, wherein surface area of transition metal oxide having micro-mesoporous structure is from 100 m²/g to 500 m²/g.

Exhibit A

Petition for Prove

February 26, 2004

In the Catalytic Society,
Chairman: Mr. Koichi Segawa

Applicant
332-0012 4-1-8 hon-cho, Kawaguchi-shi
Juristic Person Japan Science and Technology Agency
President Noriki OKIMURA 

The applicant hereby requests to be proved that the Abstract of A session of 88th Catalytic Forum was distributed on the first day of the Forum.

1. Title of the Publication; 88th Catalytic Forum, Abstract of A session
2. Title of Forum; 88th Catalytic Forum
3. Date of Forum; October 9-12, 2001
4. Location; B-con Plaza in Beppu-shi
5. Date of printing of the Abstract; September 20, 2001
6. Date of distribution of the Abstract; October 9, 2001

Catalytic Society proves that the above contents are true.

February 26, 2004


140-0022, 302 Shinikedayama Mantion,
5-21-13 Higashi Gotanda, Shinagawa-ku, Tokyo, Japan
Catalytic Society
Chairman Koichi Segawa 

Exhibit B

88th Catalytic Forum
Abstract of Session A
Printed on September 20, 2001

Publisher Catalytic Society
Published 140-0022, 302 Shinikedayama Nantion
5-21-13 Higashi Gotanda, Shinagawa-ku, Tokyo, Japan
Catalytic Society, 03-3444-2126
Printing 870-0937, 8-1 Minamitsuru, Ohita, Ohita, Japan
Youmei-sha Co., Ltd. 097-558-5687
URL: <http://www.youmei.co.jp>
E-mail: info@youmei.co.jp

*Exhibit C*RECEIVED
CENTRAL FAX CENTER

AUG 22 2006

DECLARATION

Sir: I, Takashi Deguchi, do hereby declare that I am a citizen of Japan and Managing Director of the Catalysis Society of Japan, having a principle place of business at 1-5, Kanda Surugadai, Chiyoda-ku, Tokyo, Japan.

I am familiar with all affairs of the Catalysis Society of Japan.

I further declare that an Abstract of session A of the 88th Catalysis Society of Japan Meeting which was held by Catalysis Society of Japan on October 9-12, 2001, entitled "Synthesis of High Surface area Microporous Niobium Oxide Using Neutral Template and Characterization" was not distributed and/or made publicly available until the first day of the Meeting (October 9, 2001). In other words, it is critical that I expressly state that the Abstract was not released to the public or made in any way available prior to October 9, 2001.

June 27, 2006

Title: Catalysis Society of Japan
Address: 1-5, Kanda Surugadai,
Chiyoda-ku, Tokyo, Japan

Signed by Takashi Deguchi
Takashi Deguchi